PAPER MAKING HISTORY AND FACTS

Primitive man scratched notes on cave walls, Babylonians carried messages on clay tablets; and ancient Egyptians wrote on sheets made from a native grass, Papyrus, from which our word “paper” is derived.

In 105 A.D., Ts’ai Lun, a Chinese, became unhappy with silk and bamboo writing materials. He made the first sheet of true paper using the inner bark of mulberry trees and other fibers form fish nets, old rags and hemp.

Ts’ai Lun formed this first true paper from fibers that had been beaten until each filament was a separate unit. These fibers were intermixed with water and by use of a sieve-like screen, the fibers were lifted form the water in the form of a thin layer. The water dripped through the small openings of the screen, leaving a sheet of matted fibers. This thin layer of intertwined fiber was paper.

From Ts’ai Lun’s time, 105 years after the birth of Christ, until today, paper is made using precisely the same principle.

INTRODUCTION OF MACHINERY

Through the 18th century, the papermaking process remained essentially unchanged. Linen and cotton provided the basic raw materials for this process. In 1799 Louis Robert, a Frenchman, invented the first papermaking machine. From this crude beginning, modern papermaking machines evolved.

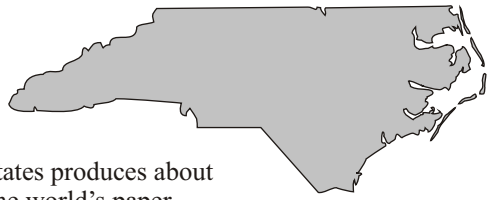
WOOD PULP

During the 1800’s several major wood pulping processes were developed that relieved the paper industries’ dependence on cotton and linen as raw materials.

Groundwood Pulp is used today to make items such as cardboard boxes and paper bags. It is the material of choice for paper where high whiteness or permanence is not needed. Groundwood pulp is made by mechanically grinding the wood and mixing the fiber with water.

Chemical Wood Pulp is made by cooking wood chips with a chemical solution in digesters under high temperature and pressure. This chemical wood pulp can be bleached and used for making fine quality paper where high brightness, strength, and permanence are required.

NORTH CAROLINA’S FORESTS AND PAPER



The United States produces about one-third of the world’s paper.

The thirteen Southern States provide two-thirds of America’s pulpwood, making our area “America’s woodbasket”.

Each person uses about 500 pounds of paper each year.

There are eight paper mills operating in North Carolina. Approximately 20,900 people are employed by paper and allied industry. Payroll for these employees is $372 million per year.

The value of products from paper and allied products manufacturing in North Carolina is over $2 billion annually.

NCDENR
North Carolina Department of Environment and Natural Resources

Secretary
Wayne McDevitt

Governor
James B. Hunt Jr.,

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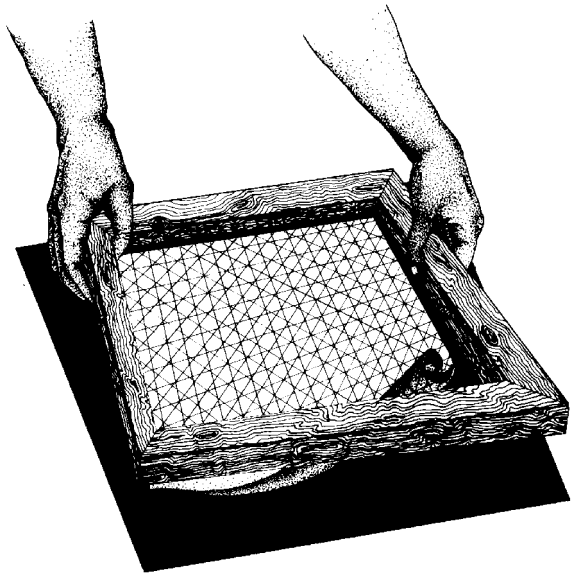
MAKING HANDMADE PAPER



Also...

HISTORY & FACTS OF PAPER MAKING

NORTH CAROLINA FOREST SERVICE NC

North Carolina Division of Forest Resources
P.O. Box 29581, Raleigh, NC 27626

MAKING HANDMADE PAPER

Materials:

Old paper to recycle; water; various fibers such as lint, hair, weeds, thread etc.; white glue

Tools:

Kitchen blender, containers such as a jar, kettles, buckets plastic dishpans for vats (or ½ wooden barrel, for a more rustic look); paper molds, and deckles; lots of newspaper; cotton cloths; woolen felts; sponges.

Making paper is simple. Fabrics are suspended in water, lifted out on a screen mold, and flopped on absorbent cloth, pressed and dried.

Making pulp: Tear the paper that is to be recycled into pieces about 1"x2". Soak these bits of paper in water until they are soggy. (The length of time will depend on the type of paper. For example, rag paper should be boiled for an hour or so.) Fill the blender container about three quarters full of water and place a small amount of the soaked paper in the container. Blend until fibers are broken and mushy. Put this pulp into a container and continue this process until you have a supply of pulp. Divide and color with dye, powdered paints or ink. If sizing is desired, add a generous squirt of white glue.

To prepare a working space: Gather the prepared pulp, vats, molds, and deckles into one area. In another area which is relatively free from dripping water, spread several layers of newspapers on a flat surface and cover with a damp felt (old woolen blanket scraps or old woolen felt pieces). Have couching cloths (cotton cloths) nearby. Keep a supply of additional newspapers handy.

Paper making: Pour the pulp (and any additives) into a vat containing water. (This vat should contain much more water than pulp.) Add additional sizing to vat.

Place the deckle on the screen side (top side) of the mold. Stir the pulp in the vat (this is called "hogging the vat") to keep the fibers in suspension. Grasp the mold and deckle firmly in both hands, dip them under the fibers and lift straight up out of the vat. While lifting, give the mold a slight jiggle to help the fibers mesh. Let the mold drain over the vat and carefully remove the deckle.

Couching the paper: (Removing wet paper) Carefully place the mold, paper side down on the wet felt which was placed over the newspaper (see: To Prepare Working Space). With a sponge or other absorbent material, pat the back of the screen to remove the excess water.

Carefully lift the mold form one side. (If the paper sticks to the screen, gently thump the back of the screen and peel the paper from the mold.)

Place a cotton couching cloth over the wet paper on the felt. Lift the felt, the newly-made paper and the cotton cloth. Flip and place couching cloth down on another dry stack of newspapers.

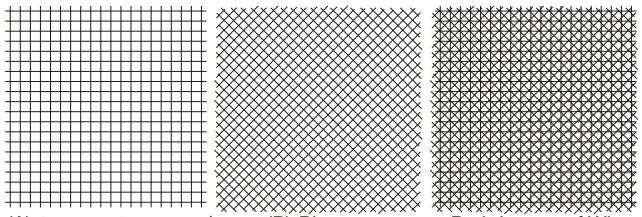
Carefully roll back the felt. The paper will stick to the couching cloth. Place another dry couching cloth over the paper and continue. When paper is slightly dry, pick up gently, place on a dry cloth and make a stack with other pieces of the same size. This stack is called a post. Press the post between two boards under a heavy weight.

Drying the paper: Uneven drying my cause the paper to curl. Daily attention with dry couching cloths, felts, and newspaper will make a flatter piece of paper.

Drying may be speeded up by ironing the paper between two dry cloths or by placing the paper between blotters in a dry mount press or in a slow oven. In each case, the paper and cloths should be flipped occasionally in order to insure even drying.

For Teachers: In order to couch the paper, have each child put his or her name on the outside of a folded section of newspaper. Remove wet paper directly from the couching cloth onto one side of the inner fold of newspaper. Take sections from all the children, stack them carefully and weigh them down with a pile of books or other heavy object. Check the stack daily and remove dry paper when dry enough to handle.

MAKING A PAPER MOLD:



MAKING A PAPER MOLD

Materials:

¾" X ¾" lumber, wood glue, galvanized finishing nails, screen wire, staples and duck tape

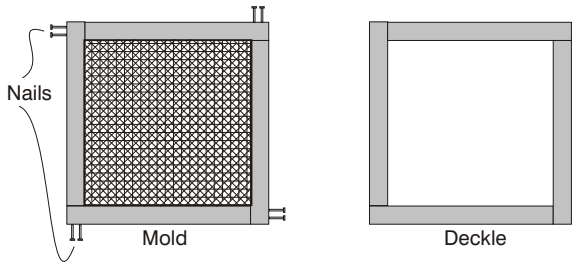
Tools:

Saw, hammer, stapler, scissors

Ask the lumber yard to rip the ¾" thick board into pieces ¾" wide. Cut eight pieces of the same length from this stock. Four of these will make the paper mold and four will make the deckle. (It is possible to make a rectangular mold and deckles by cutting the lumber into different lengths.) Glue and nail each joint using two nails per joint. Make two frames of the same size.

Using the frame as a measurement, cut two pieces of screen. One piece should be cut on the straight grain of the screen (a). The other piece should be cut on the bias (b).

Put both pieces of wire together and staple them to one of the frames. It is important to keep the wire taunt.



Trim any overhanging wire and tape the edges of the mold with duck tape. Leave the other frame empty. The frame with the screen is the mold; the empty frame is the deckle.

If you wish, molds can be made of stock lumber. However, children's hands can not span the two frames. (The mold and deckle are lifted together while making paper.) Adults find the thinner molds described above easier to use.

A round mold can be made from two embroidery hoops. Fit two layers of screen into one hoop as you would fabric. Tighten the hoop until the screen is taunt. Trim the wire close to the edge of the hoop. Use the inner rim of the second hoop as the deckle. (The outer rim of the second hoop may be discarded.)